

PATENT COOPERATION TREATY

PCT

NOTIFICATION OF THE RECORDING
OF A CHANGE(PCT Rule 92bis.1 and
Administrative Instructions, Section 422)

From the INTERNATIONAL BUREAU

To:

KOHRs, Martin
THOMSON multimedia
46 quai Alphonse Le Gallo
F-92648 Boulogne Cedex
FRANCE

Date of mailing (day/month/year) 19 November 2001 (19.11.01)	IMPORTANT NOTIFICATION
Applicant's or agent's file reference PF990066	
International application No. PCT/EP00/09922	International filing date (day/month/year) 06 October 2000 (06.10.00)

1. The following indications appeared on record concerning:		
<input checked="" type="checkbox"/> the applicant	<input type="checkbox"/> the inventor	<input type="checkbox"/> the agent
<input type="checkbox"/> the common representative		
Name and Address THOMSON MULTIMEDIA 46 Quai Alphonse Le Gallo F-92100 Boulogne-Billancourt France	State of Nationality FR	State of Residence FR
	Telephone No. 33 1 41 86 52 73	
	Facsimile No. 33 1 41 86 56 34	
	Teleprinter No.	
2. The International Bureau hereby notifies the applicant that the following change has been recorded concerning:		
<input type="checkbox"/> the person	<input checked="" type="checkbox"/> the name	<input type="checkbox"/> the address
<input type="checkbox"/> the nationality		
<input type="checkbox"/> the residence		
Name and Address THOMSON LICENSING S.A. 46 Quai Alphonse Le Gallo F-92100 Boulogne-Billancourt France	State of Nationality FR	State of Residence FR
	Telephone No. 33 1 41 86 52 73	
	Facsimile No. 33 1 41 86 56 34	
	Teleprinter No.	
3. Further observations, if necessary:		
4. A copy of this notification has been sent to:		
<input checked="" type="checkbox"/> the receiving Office	<input type="checkbox"/> the designated Offices concerned	
<input type="checkbox"/> the International Searching Authority	<input checked="" type="checkbox"/> the elected Offices concerned	
<input checked="" type="checkbox"/> the International Preliminary Examining Authority	<input type="checkbox"/> other:	

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland	Authorized officer Athina NICKITAS-ETIENNE
Facsimile No.: (41-22) 740.14.35	Telephone No.: (41-22) 338.83.38

EXPRESS EV025 963084US

PCT/EP00/09922

HUCHET

THOMSON multimedia RECEIVED
26 NOV. 2001
Patent Department Administration - Paris

PCT/RECEIVED

 cc
 / 3 NOV. 2001

PCT

 Patent Operations
 THOMSON multimedia Rennes

From the INTERNATIONAL BUREAU

To:

 KOHRS, Martin
 THOMSON multimedia
 46 quai Alphonse Le Gallo
 F-92648 Boulogne Cedex
 FRANCE

 NOTIFICATION OF THE RECORDING
 OF A CHANGE

 (PCT Rule 92bis.1 and
 Administrative Instructions, Section 422)

Date of mailing (day/month/year) 19 November 2001 (19.11.01)	IMPORTANT NOTIFICATION
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International application No. PCT/EP00/09922	International filing date (day/month/year) 06 October 2000 (06.10.00)

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☒ the applicant
 ☐ the inventor
 ☐ the agent
 ☐ the common representative

Name and Address THOMSON MULTIMEDIA 46 Quai Alphonse Le Gallo F-92100 Boulogne-Billancourt France	State of Nationality FR	State of Residence FR
	Telephone No. 33 1 41 86 52 73	
	Facsimile No. 33 1 41 86 56 34	
	Teleprinter No.	

2. The International Bureau hereby notifies the applicant that the following change has been recorded concerning:

☐ the person
 ☒ the name
 ☐ the address
 ☐ the nationality
 ☐ the residence

Name and Address - FR THOMSON LICENSING S.A. 46 Quai Alphonse Le Gallo F-92100 Boulogne-Billancourt France	State of Nationality FR	State of Residence FR
	Telephone No. 33 1 41 86 52 73	
	Facsimile No. 33 1 41 86 56 34	
	Teleprinter No.	

3. Further observations, if necessary:

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☒ the receiving Office
 ☐ the designated Offices concerned
☐ the International Searching Authority
 ☒ the elected Offices concerned
☒ the International Preliminary Examining Authority
 ☐ other:

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No.: (41-22) 740.14.35	Authorized officer Athina NICKITAS-ETIENNE Telephone No.: (41-22) 338.83.38
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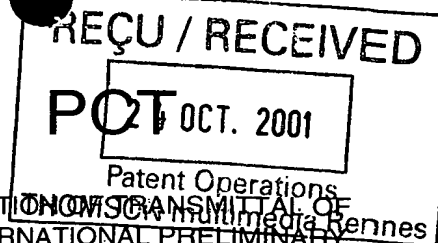
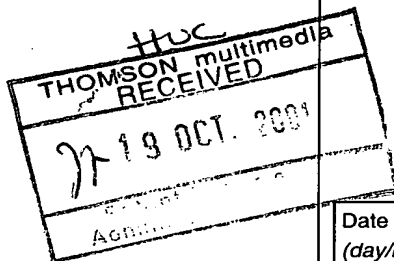
PATENT COOPERATION TREATY

EXPRESS ● EV025963 08445

From the
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

To:

KERBER, Thierry
THOMSON MULTIMEDIA
46 Quai Alphonse Le Gallo
92648 BOULOGNE Cedex
FRANCE



Patent Operations
THOMSON multimedia Rennes
NOTIFICATION TRANSMITTAL OF
THE INTERNATIONAL PRELIMINARY
EXAMINATION REPORT
(PCT Rule 71.1)

Date of mailing
(day/month/year) 16.10.2001

Applicant's or agent's file reference
PF990066

IMPORTANT NOTIFICATION

International application No.
PCT/EP00/09922

International filing date (day/month/year)
06/10/2000

Priority date (day/month/year)
07/10/1999

Applicant
THOMSON MULTIMEDIA et al

1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary examination report and its annexes, if any, established on the international application.
2. A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.
3. Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translation to those Offices.

4. REMINDER

The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices) (Article 39(1)) (see also the reminder sent by the International Bureau with Form PCT/IB/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary examination report. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the PCT Applicant's Guide.

Name and mailing address of the IPEA/

 European Patent Office
D-80298 Munich
Tel. +49 89 2399 - 0 Tx: 523656 epmu d
Fax: +49 89 2399 - 4465

Authorized officer

Schalinatus, D
Tel. +49 89 2399-8242



PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference PF990066	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/EP00/09922	International filing date (day/month/year) 06/10/2000	Priority date (day/month/year) 07/10/1999
International Patent Classification (IPC) or national classification and IPC H04N9/877		
Applicant THOMSON MULTIMEDIA et al		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.


2. This REPORT consists of a total of 5 sheets, including this cover sheet.

☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 4 sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

Date of submission of the demand 02/05/2001 ✓	Date of completion of this report 16.10.2001
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized officer Schinnerl, A Telephone No. +49 89 2399 8609



INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/EP00/09922

I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

Description, pages:

3-10 as originally filed

1,2 as received on 28/09/2001 with letter of 11/09/2001

Claims, No.:

1-6 as received on 28/09/2001 with letter of 11/09/2001

Drawings, sheets:

1-4 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/EP00/09922

- ☐ the description, pages:
- ☐ the claims, Nos.:
- ☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	1-6
	No:	Claims	
Inventive step (IS)	Yes:	Claims	1-6
	No:	Claims	
Industrial applicability (IA)	Yes:	Claims	1-6
	No:	Claims	

2. Citations and explanations
see separate sheet

Re Item V

Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

- 1 Reference is made to the following document:

D1: EP-A-0 841819

- 2 The document D1 represents the closest prior art and discloses that video and audio information is temporarily stored in respective video and audio buffers. Time information, which is generated from the video blockrate information, is used to read out a predetermined quantity of video and audio information from the respective buffers. The read out information is subsequently stored in a hard disc.

The method according to claim 1 differs from the method described in D1 in that the total quantity of data stored in all buffers is monitored and that the data contained in the buffers is written on a recording medium when the total quantity of the stored data reaches a predetermined level. The independent device claim 5 contains the same distinguishing feature.

None of the available prior art documents discloses or suggests that data should be read out from buffers when the total quantity of the stored data reaches a predetermined level. The further document cited in the International Search Report is more remote than document D1. It does not give any details of how data are read out from buffers.

Therefore, the subject-matter claimed in claims 1 and 5 is neither known nor rendered obvious by the available prior art documents and therefore the requirements of Articles 33(2) and 33(3) are met.

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/EP00/09922

Dependent claims 2-4 and 6 are related to embodiments of the invention according to claims 1 and 5, and also meet the requirements of Articles 33(2) and 33(3) PCT.

Industrial applicability: in the field of video recording.

INTERNATIONAL SEARCH REPORT

International Application No

PCT/EP 00/09922

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 H04N9/877

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 H04N

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 0 762 756 A (MATSUSHITA ELECTRIC INDUSTRIAL CO., LTD.) 12 March 1997 (1997-03-12) page 5, line 14 - line 41; figure 1 ---	1,5
A	EP 0 841 819 A (MATSUSHITA ELECTRIC INDUSTRIAL CO., LTD.) 13 May 1998 (1998-05-13) column 17, line 28 -column 28, line 41; figures 1-6 -----	1,5

☐

Further documents are listed in the continuation of box C.

☒

Patent family members are listed in annex.

* Special categories of cited documents :

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

- *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- * & * document member of the same patent family

Date of the actual completion of the international search

16 February 2001

Date of mailing of the international search report

23/02/2001

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Verleye, J

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/EP 00/09922

Patent document cited in search report		Publication date	Patent family member(s)		Publication date
EP 762756	A	12-03-1997	JP	8138318 A	31-05-1996
EP 841819	A	13-05-1998	JP	11075171 A	16-03-1999

Method and device for writing data to a recording medium in a digital video system

5 The invention concerns a method and device for writing data, such as compressed video, audio and auxiliary data, to a recording medium and in particular for managing the write buffers of the device.

An MPEG II or DVB compliant digital television stream comprises several layers, among which the elementary stream layer, the Packetized
10 Elementary Stream (PES) layer and the Transport Stream (TS) layer. A corresponding decoder usually comprises a demultiplexer for filtering certain TS layer packets, a PES Parser for removing the PES layer and transferring the original elementary streams and at least a video decoder for decoding the video elementary stream.

15 Future decoders will incorporate mass storage devices in order to record compressed TS or PES streams. The French patent applications 2787962 and 2787963 filed on December 28, 1998 in the name of THOMSON multimedia describe a digital video receiver integrating a hard disk for recording compressed A/V streams. The receiver comprises buffers for accumulating
20 audio, video and auxiliary data, where the writing of all accumulated data to a fixed-size block of the disk is triggered when the amount of video data reaches a predetermined level. Although this system has many advantages, disk space is not used with maximum efficiency, because it is necessary to fill unused space of a data block attributed to either audio or auxiliary data on the disk with
25 stuffing bits.

An object of the invention is a method for recording data in a digital video processing device connectable to a recording medium, characterized in that it comprises the steps of:

- 30 - receiving a stream of data packets, each data packet being associated to one of N packet identifier (PID);
- providing N ($N > 1$) buffers for receiving respectively packets corresponding to one of N packet identifiers PIDs;
- monitoring the total of quantity of data stored in the N buffers; and
35 - triggering a writing process of the data contained in the buffers to the recording medium when said total quantity of data reaches a predetermined level.

As the sum of the quantities of data in the different buffers triggers the writing process, the predetermined total quantity of data is always fully used by useful data. No stuffing bits are necessary when writing the data to the recording medium.

According to an embodiment of the invention, the predetermined level corresponds to the size of a data recording unit on the recording medium, minus the quantity of space reserved to service information.

10

Typically, the service information includes a header for the concatenated data from the buffers.

According to an embodiment of the invention, the writing step comprises the writing of the data in the different buffers to a same recording unit.

As will be described in the detailed description, a recording unit on the recording medium has a size adapted to the kind of data which is to be recorded (i.e. an audio/video stream). According to the example below, this size is of 128 Kbytes, but it may be greater.

According to an embodiment of the invention, the method further comprises the step of writing a header into said recording unit, said header indicating for the data from each buffer: the corresponding **PID packet identifier**, the size and location of the data in the recording unit.

Another object of the invention is a digital video processing device comprising a demultiplexer and a recording medium, characterized in that it further comprises:

30

- N buffers, where N is an integer greater than one,

- means for controlling the writing of demultiplexed data packets, each data packet being associated to one of N packet identifiers, into said buffers, where each buffer receives data packets corresponding to a specific **PID packet identifier**, and for controlling the quantity of data packets in each buffer in order to trigger the writing of the buffer contents to the recording medium when the sum of data packets in all buffers reaches a predetermined level.

35

Claims

1. Method for recording data in a digital video processing device connectable to a recording medium, characterized in that it comprises the steps of:

- receiving a stream of data packets each data packet being associated to one of N packet identifier (PID);
- providing N ($N > 1$) buffers for receiving respectively packets corresponding to one of N packet identifiers;
- monitoring the total of quantity of data stored in the N buffers; and
- triggering a writing process of the data contained in the buffers to the recording medium when said total quantity of data reaches a predetermined level.

2. Method according to claim 1, wherein the predetermined level corresponds to the size of a data recording unit on the recording medium, minus the quantity of space reserved to service information.

3. Method according to claim 2, wherein the writing step comprises the writing of the data in the different buffers to a same recording unit.

4. Method according to claim 3, further comprising the step of writing a header into said recording unit, said header indicating for the data from each buffer: the corresponding packet identifier, the size and location of the data in the recording unit.

5. Digital video processing device comprising a demultiplexer (4) and a recording medium (12), characterized in that it further comprises:

- N buffers, where N is an integer greater than one,
- means (10) for controlling the writing of demultiplexed data packets, each data packet being associated to one of N packet identifiers, into said buffers, where each buffer receives data packets corresponding to a specific packet identifier, and for controlling the quantity of data packets in each buffer in order to trigger the writing of the buffer contents to the recording medium when the sum of data packets in all buffers reaches a predetermined level.

6. Device according to claim 5, wherein the predetermined level corresponds to the size of a data recording unit on the recording medium.

Method and device for writing data to a recording medium in a digital video system

5 The invention concerns a method and device for writing data, such as compressed video, audio and auxiliary data, to a recording medium and in particular for managing the write buffers of the device.

An MPEG II or DVB compliant digital television stream comprises several layers, among which the elementary stream layer, the Packetized
10 Elementary Stream (PES) layer and the Transport Stream (TS) layer. A corresponding decoder usually comprises a demultiplexer for filtering certain TS layer packets, a PES Parser for removing the PES layer and transferring the original elementary streams and at least a video decoder for decoding the video elementary stream.

15 Future decoders will incorporate mass storage devices in order to record compressed TS or PES streams. The French patent applications 2787962 and 2787963 filed on December 28, 1998 in the name of THOMSON multimedia describe a digital video receiver integrating a hard disk for recording compressed A/V streams. The receiver comprises buffers for accumulating
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25 stuffing bits.

An object of the invention is a method for recording data in a digital video processing device connectable to a recording medium, characterized in that it comprises the steps of:

- 30 - receiving a stream of data packets;
- providing N ($N > 1$) buffers for receiving respectively packets corresponding to one of N PIDs;
- monitoring the total of quantity of data stored in the N buffers; and
- triggering a writing process of the data contained in the buffers to
35 the recording medium when said total quantity of data reaches a predetermined level.

As the sum of the quantities of data in the different buffers triggers the writing process, the predetermined total quantity of data is always fully used by useful data. No stuffing bits are necessary when writing the data to the recording medium.

5

According to an embodiment of the invention, the predetermined level corresponds to the size of a data recording unit on the recording medium, minus the quantity of space reserved to service information.

10

Typically, the service information includes a header for the concatenated data from the buffers.

15

According to an embodiment of the invention, the writing step comprises the writing of the data in the different buffers to a same recording unit.

20

As will be described in the detailed description, a recording unit on the recording medium has a size adapted to the kind of data which is to be recorded (i.e. an audio/video stream). According to the example below, this size is of 128 Kbytes, but it may be greater.

25

According to an embodiment of the invention, the method further comprises the step of writing a header into said recording unit, said header indicating for the data from each buffer: the corresponding PID, the size and location of the data in the recording unit.

30

Another object of the invention is a digital video processing device comprising a demultiplexer and a recording medium, characterized in that it further comprises:

- N buffers, where N is an integer greater than one,
- means for controlling the writing of demultiplexed data packets into said buffers, where each buffer receives data packets corresponding to a specific PID, and for controlling the quantity of data packets in each buffer in order to trigger the writing of the buffer contents to the recording medium when the sum of data packets in all buffers reaches a predetermined level.

35

According to an embodiment of the invention, the predetermined level corresponds to the size of a data recording unit on the recording medium.

Claims

1. Method for recording data in a digital video processing device
5 connectable to a recording medium, characterized in that it comprises the steps
of:

- receiving a stream of data packets;
- providing N ($N > 1$) buffers for receiving respectively packets
corresponding to one of N PIDs;
- 10 - monitoring the total of quantity of data stored in the N buffers; and
- triggering a writing process of the data contained in the buffers to
the recording medium when said total quantity of data reaches a predetermined
level.

15 2. Method according to claim 1, wherein the predetermined level
corresponds to the size of a data recording unit on the recording medium, minus
the quantity of space reserved to service information.

20 3. Method according to claim 2, wherein the writing step comprises
the writing of the data in the different buffers to a same recording unit.

25 4. Method according to claim 3, further comprising the step of writing
a header into said recording unit, said header indicating for the data from each
buffer: the corresponding PID, the size and location of the data in the recording
unit.

5. Digital video processing device comprising a demultiplexer (4) and
a recording medium (12), characterized in that it further comprises:

- N buffers, where N is an integer greater than one,
- 30 - means (10) for controlling the writing of demultiplexed data packets
into said buffers, where each buffer receives data packets corresponding to a
specific PID, and for controlling the quantity of data packets in each buffer in
order to trigger the writing of the buffer contents to the recording medium when
the sum of data packets in all buffers reaches a predetermined level.

35 6. Device according to claim 5, wherein the predetermined level
corresponds to the size of a data recording unit on the recording medium.